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*Indian Standard*  
SPECIFICATION FOR  
HIGH-PROTEIN MIXES FOR USE AS FOOD  
SUPPLEMENTS  
( *First Revision* )

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Second Reprint FEBRUARY 1992

UDC 664.647.6:664.38

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BUREAU OF INDIAN STANDARDS  
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
NEW DELHI 110002

# *Indian Standard*

## SPECIFICATION FOR HIGH-PROTEIN MIXES FOR USE AS FOOD SUPPLEMENTS

### *( First Revision )*

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*Indian Standard*  
SPECIFICATION FOR  
HIGH-PROTEIN MIXES FOR USE AS FOOD  
SUPPLEMENTS  
( *First Revision* )

0. FOREWORD

**0.1** This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 27 September 1974, after the draft finalized by the Nutrition Sectional Committee had been approved by the Agricultural and Food Products Division Council.

**0.2** A specification for Indian Multipurpose Food (IMF) with groundnut as the base was issued in 1965 as IS:3137-1965\*. With the passage of time it has been felt that the scope of the earlier standard should be extended to cover the use of edible flours from soya, cottonseed, sesame, coconut, etc. This is also desirable since excise duty exemption has been granted in October 1971 for all such products which contain 70 percent of edible oilseed flours, 39 percent of protein and an ex-factory price not exceeding Rs 3.00 per kg.

**0.2.1** Considering that protein quality improves as a result of adding amino acids, this standard also includes provisions for other micronutrients. This would ensure optimization of nutritive value of the high-protein mixes as well.

**0.3** Two grades of IMF were originally specified, with minimum of 42 percent and 39 percent protein. Only the former appears to be in actual manufacture even 7 years after issue of the standard, and hence the 42 percent protein product, which was specified to contain 10 percent by mass of skim milk powder, has been deleted from the present specification. Methods of preparation of edible groundnut flour have also been deleted from this revision. In view of the wide range of raw materials now proposed, it has been felt desirable to specify the protein quality in terms of Protein Efficiency Ratio (PER) rather than in terms of available lysine as in the original specification. For the same reason, the mandatory use of Bengal gram flour

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\*Specification for Indian multipurpose food flour.

in the earlier specification has been lifted and a greater flexibility provided. Indian multipurpose food flour will, as understood now, of course, form an important example of the present specification.

**0.4** The basis of calculation for values prescribed in Table 2 is that to obtain 13 g of protein in a supplementary food using such a mix, about 33 g of the mix will have to be used. If this amount is to contain one-third of the recommended daily allowance, 100 g should contain the total recommended allowance of each nutrient.

**0.5** This standard has been formulated in close collaboration with the Protein Foods and Nutrition Development Association of India. While formulating this standard, necessary consideration has also been given to the relevant rules prescribed by the Government of India, under the Prevention of Food Adulteration Act, 1954. This standard is subject to restrictions imposed under the Act and the Rules framed thereunder, wherever applicable.

**0.6** For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS:2-1960\*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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## **1. SCOPE**

**1.1** This standard (First Revision) prescribes the requirements and the methods of sampling and test for high-protein nutritive (see 0.2.1) mixes for use as food supplements.

## **2. TERMINOLOGY**

**2.0** For the purpose of this standard, the following definitions shall apply.

**2.1 Routine Tests** — Tests (see 3.1) carried out on each lot to check the essential requirements that are likely to vary during production.

**2.2 Type Tests** — All the tests (see 3.2) to approve the formulation and quality of the product at least in the beginning of marketing/certification. These tests may also be conducted periodically to supplement the routine tests or whenever the basic formula is changed.

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\*Rules for rounding off numerical values (revised).



**2.3 Acceptance Test** — Test carried out on samples selected from the lot for the purpose of acceptance of the lot.

### 3. REQUIREMENTS

#### 3.1 Routine Tests

**3.1.1 Description** — High-protein nutritive mixes shall be made by thoroughly blending various ingredients, particularly edible oilseed flours. The flour(s), when used, shall conform to the following standards:

- a) Groundnut flour — IS: 4684-1968\* or IS: 4875-1968†;
- b) Cottonseed flour — IS: 4874-1968‡ or IS: 4876-1968§;
- c) Soya flour — IS: 5275-1969|| or IS: 5276-1969¶;
- d) Sesame flour — IS: 6108-1971\*\* or IS: 6109-1971††.

**3.1.1.1** The proportion of edible oilseed flour(s) shall be at least 70 percent by mass. Flours of cleaned and roasted pulses (legumes) may also be blended to give the total mix. The product shall be fortified with vitamins and minerals. It shall be free from insect or fungus infestation and from objectionable odours and rancid taste. The high-protein nutritive mixes may be salted, flavoured or spiced if desired.

**3.1.2 Freedom from Toxins** — *KESARI DAL* (*Lathyrus sativus*) shall not be used in making high-protein nutritive mixes and any other gram or pulse used shall be free from it (see IS: 2400-1963‡‡).

**3.1.3 Fineness** — The high-protein nutritive mixes shall be of such fineness as agreed to between the purchaser and the manufacturer.

**3.1.4 Condition of Manufacture** — The high-protein nutritive mixes shall be manufactured, packed, stored and distributed in premises maintained under hygienic conditions (see IS: 2491-1972§§).

\*Specification for edible groundnut flour ( expeller pressed ).

†Specification for edible groundnut flour ( solvent extracted ).

‡Specification for edible cottonseed flour ( expeller pressed ).

§Specification for edible cottonseed flour ( solvent extracted ).

||Specification for edible soya flour ( expeller pressed ).

¶Specification for edible soya flour ( solvent extracted ).

\*\*Specification for edible sesame flour ( expeller pressed ).

††Specification for edible sesame flour ( solvent extracted ).

‡‡Specification for *BESAN* ( under revision ).

§§Code for sanitary conditions for food processing units ( first revision ).

**3.1.5** The high-protein nutritive mixes shall also conform to the requirements given in Table 1.

**TABLE 1 REQUIREMENTS FOR HIGH-PROTEIN NUTRITIVE MIXES FOR USE AS FOOD SUPPLEMENTS**

SL No.	CHARACTERISTIC	REQUIREMENT	METHOD OF TEST, REF TO	
			Appendix	IS:
(1)	(2)	(3)	(4)	(5)
i)	Moisture, percent by mass, <i>Max</i>	7.0	A	1155-1968*
ii)	Protein, percent by mass, <i>Min</i>	39.0	—	7219-1973†
iii)	Total ash, percent by mass, <i>Max</i>	6.0	B	1155-1968*
iv)	Acid insoluble ash, percent by mass, <i>Max</i>	0.3	C	1155-1968*
v)	Crude fibre (on dry basis), percent by mass, <i>Max</i>	3.2	E	1155-1968*
vi)	Total bacterial count/g, <i>Max</i>	50 000	—	5402-1969‡
vii)	Coliform bacterial count/g, <i>Max</i>	10	—	5401-1969§
viii)	Salmonella bacteria	Nil	—	5887-1970

\*Specification for wheat *ATTA* (second revision).

†Method for determination of protein in foods and feeds.

‡Method for plate count of bacteria in foodstuffs.

§Methods for detection and estimation of coliform bacteria in foodstuffs.

||Methods for detection of bacteria responsible for food poisoning and food-borne diseases.

## 3.2 Type Tests

**3.2.1 Protein** — PER, when determined, shall be not less than 1.8 (corrected PER) on the basis of IS: 7481-1974\*. The quantity of protein shall be estimated on the basis of IS: 7219-1973†.

**3.2.2 Aflatoxin** — The high-protein nutritive mixes for use as food supplements shall not have total aflatoxin content more than 30 mcg/kg of foods, when tested according to the method prescribed in Appendix K of IS: 4684-1968‡.

**3.2.3 Gossypol** — The high-protein nutritive mixes for use as food supplements shall not have the gossypol content more than 0.065 percent by mass and total free gossypol content not more than 1.10 percent by mass, when tested according to the method prescribed in Appendix A of IS: 4874-1968§.

\*Method of determination of protein efficiency ratio (PER).

†Method for determination of protein in foods and feeds.

‡Specification for edible groundnut flour (expeller pressed).

§Specification for edible cottonseed flour (expeller pressed).

**3.2.4 Urease Activity** — The high-protein nutritive mixes for use as food supplements shall not show a change in pH by more than 1.0, when determined by the method given in Appendix B of IS : 5275-1969\*.

NOTE — Aflatoxin content, gossypol content and urease activity shall be determined when flours of groundnut, cottonseed and soya respectively have been used in manufacturing the high-protein nutritive mix.

**3.2.5** The high-protein nutritive mixes shall also comply with the requirements given in Table 2. Additional nutrients may also be added but they shall be declared.

**TABLE 2 REQUIREMENTS OF VITAMINS AND MINERALS FOR HIGH-PROTEIN NUTRITIVE MIXES FOR USE AS FOOD SUPPLEMENTS**

Sl No.	CHARACTERISTIC	REQUIREMENT	METHOD OF TEST, REF TO
(1)	(2)	(3)	(4)
i)	Vitamin A, mcg/100 g, <i>Min</i>	300	IS : 5886-1970*
ii)	Vitamin D, mcg/100 g, <i>Min</i>	5	IS : 5835-1970†
iii)	Vitamin B <sub>12</sub> , mcg/100 g, <i>Min</i>	0.75	Note below
iv)	Folic acid, mcg/100 g, <i>Min</i>	75	Note below
v)	Ascorbic acid, mg/100 g, <i>Min</i>	45	IS : 5838-1970‡
vi)	Thiamine (as hydrochloride), mg/100 g, <i>Min</i>	0.8	IS : 5398-1969§
vii)	Riboflavin, mg/100 g, <i>Min</i>	0.8	IS : 5399-1969
viii)	Nicotinic acid, mg/100 g, <i>Min</i>	9	IS : 5400-1969¶
ix)	Calcium, mg/100 g, <i>Min</i>	450	Appendix F of IS : 1656-1969**
x)	Iron, mg/100 g, <i>Min</i>	18	
xi)	Pyridoxine, mg/100 g, <i>Min</i>	2.0	

NOTE — As there are no rapid and routine methods for determining the vitamin B<sub>12</sub> and folic acid contents of a product, the manufacturers should maintain a record showing the quantity of these vitamins added to the product.

\*Methods for estimation of carotenes and vitamin A (retinol) in foodstuffs.

†Methods for estimation of vitamin D in foodstuffs.

‡Methods for estimation of vitamin C in foodstuffs.

§Methods for estimation of thiamine (vitamin B<sub>1</sub>) in foodstuffs.

||Methods for estimation of riboflavin (vitamin B<sub>2</sub>) in foodstuffs.

¶Methods for estimation of nicotinic acid (niacin) in foodstuffs.

\*\*Specification for processed cereals weaning food (first revision).

\*Specification for edible soya flour (expeller pressed).

**3.3 Acceptance Tests** — For acceptance of the lot the material shall be tested for the following characteristics:

- a) Description (*see* 3.1.1), and
- b) For all the requirements given in Table 1.

#### **4. PACKING AND MARKING**

**4.1 Packing** — The high-protein nutritive mixes for use as food supplements shall be packed in clean, sound containers made of tinsplate, PCRC sheets, cardboard paper or other material agreed to between the purchaser and the vendor in such a way as to protect them from spillage, contamination, absorption of moisture and seepage of fat into packing material. The mixes shall not come in direct contact with the packing materials other than the grease-proof or sulphate paper, cellulose film or any other non-toxic packing material which may be covered with a moisture-proof laminates or coated paper. The mixes in tins shall not come in direct contact with the metal walls.

**4.1.1** The mixes may be packed in quantities of 200 g, 500 g or 1 kg, unless otherwise agreed to between the purchaser and the vendor.

**4.2 Marking** — The following particulars shall be marked or labelled on each container:

- a) Directions for use including the quantity of product which would meet the full daily requirements of supplements for infants and pre-school children;
- b) Calories and proteins per 100 g;
- c) Name of the material and the trade name or brand name, if any;
- d) Name and address of the manufacturer;
- e) Batch or code number; and
- f) Net mass.

**4.2.1** The container may also be marked with the ISI Certification Mark.

**NOTE** — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

#### **5. SAMPLING**

**5.1** Representative samples of the material shall be drawn as prescribed in Appendix A.

## 6. TESTS

**6.1** Tests shall be carried out as prescribed in 3.1, 3.2, and Tables 1 and 2.

**6.2 Quality of Reagents** — Unless specified otherwise, pure chemicals and distilled water (*see* IS: 1070-1960\*) shall be employed in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the test results.

## APPENDIX A

( Clause 5.1 )

### SAMPLING OF HIGH-PROTEIN NUTRITIVE MIXES FOR USE AS FOOD SUPPLEMENTS

#### A-1. GENERAL REQUIREMENTS OF SAMPLING

**A-1.0** In drawing, preparing, storing and handling samples, the following precautions and directions shall be observed.

**A-1.1** Samples shall be taken in a protected place not exposed to damp air, dust or soot.

**A-1.2** The sampling instrument shall be clean and dry when used.

**A-1.3** Precautions shall be taken to protect the samples, the material being sampled, the sampling instrument and the containers for samples from adventitious contamination.

**A-1.4** The samples shall be placed in clean and dry glass containers. The containers shall be of such a size that they are almost completely filled by the sample.

**A-1.5** Each container shall be sealed air-tight after filling and marked with full details of sampling, batch or code number, name of the manufacturer and other important particular of the consignment.

**A-1.6** Samples shall be stored in such a manner that the temperature of the material does not vary unduly from the normal temperature.

**A-1.7** Sampling shall be done by a person agreed to between the purchaser and the vendor and in the presence of the purchaser (or his representative) and the vendor (or his representative).

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\*Specification for water, distilled quality (*revised*).

**A-2. SCALE OF SAMPLING**

**A-2.1 Lot** — All the containers in a consignment belonging to the same batch of manufacture shall constitute a lot.

**A-2.1.1** Samples shall be tested from each lot for ascertaining conformity of the material to the requirements of the specification.

**A-2.2** The number of containers to be tested from a lot shall depend on the size of the lot and shall be in accordance with Table 3.

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**TABLE 3 NUMBER OF CONTAINERS TO BE SELECTED FOR SAMPLING**

TOTAL NUMBER OF CONTAINERS IN THE LOT $N$	NUMBER OF CONTAINERS TO BE SELECTED $n$
(1)	(2)
3 to 50	3
51 „ 200	4
201 „ 400	5
401 „ 650	6
651 and over	7

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**A-2.3** The containers to be selected for sampling shall be chosen at random from the lot and, for this purpose, random number tables shall be used. In case such tables are not available, the following procedure may be adopted:

Starting from any container, count them as 1, 2, 3, ....., up to  $r$  and so on, in a systematic manner. Every  $r$ th container thus counted shall be chosen;  $r$  being the integral part of  $N/n$ , where  $N$  is the total number of containers in the lot and  $n$  the number of containers to be selected.

**A-3. TEST SAMPLES AND REFEREE SAMPLE**

**A-3.1 Preparation of Individual Samples** — Empty out the contents of the container on a sheet of paper and mix thoroughly. Cone and quarter as often as necessary till about 200 g of the material is left. From this, take about 100 g of the material and divide into three approximately equal parts. Each part so obtained shall constitute an individual sample representing the container and shall be transferred immediately to thoroughly clean and dry containers, sealed air-tight and labelled with particulars given under A-1.5. The individual samples so obtained

shall be divided into three sets in such a way that each set has a sample representing each selected container. One of these sets shall be marked for the purchaser, another for the vendor and the third for the reference.

**A-3.2 Preparation of Composite Sample** — From the material from each selected container remaining after the individual sample has been taken, equal quantities of material shall be taken and mixed together so as to form a composite sample weighing not less than 1200 g. This composite sample shall be divided into three equal parts and transferred to clean dry containers made of glass and labelled with the particulars given in A-1.5. One of these composite samples shall be for the purchaser, another for the vendor and the third for the referee.

**A-3.3 Referee Samples** — Reference sample shall consist of a set of individual samples (*see* A-3.1) and a composite sample (*see* A-3.2) marked for this purpose and shall bear the seals of the purchaser and the vendor. These shall be kept at a place agreed between the two.

#### **A-4. NUMBER OF TESTS**

**A-4.1** Tests for description and protein shall be conducted on each of the samples constituting a set of individual test samples.

**A-4.2** Tests for the remaining characteristics, namely, moisture, total ash, acid insoluble ash and crude fibre shall be conducted on the composite sample.

#### **A-5. CRITERIA FOR CONFORMITY**

**A-5.1** The lot shall be considered satisfactory in respect of the requirements stated in A-4.1 if each of the individual sample satisfies all the requirements.

**A-5.2** The lot shall be considered satisfactory in respect of the requirements stated in A-4.2 if the test results on the composite sample satisfy the corresponding requirements.

**A-5.3** The lot shall be declared to be in conformity with all the requirements of this specification, if it has been found satisfactory in A-5.1 and A-5.2.

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